



Fourth GAIN World Conference
Paris, France
June 14-15, 2000

Analytical Methods and Tools

“Review of the Aircrew Incident Reporting System (AIRS)”

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Structure of the Presentation

- ➡ • TAM Story
- AIRS Experience to Date
- Operational Readiness Review
- Conclusion



Founded thirty years ago as Brazilian air taxi service, **TAM** has become Brazilian's most successful commercial airline.

Since December, **TAM** is flying to the United States, with daily flights between Miami and Sao Paulo, over twenty immediate connecting flights to major cities in Brazil and South America plus eighty other destinations.



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The TAM Fleet

TAM
Brazilian Airlines





Statistics

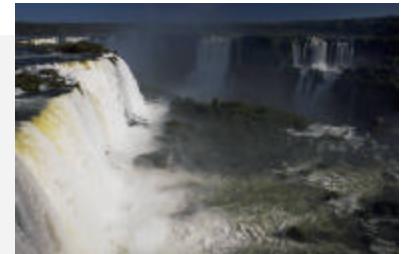


| | |
|---------------------------------------|----------|
| Total Revenues 1997(millions in US\$) | 580 |
| Increase Over 1996 | 30% |
| Net Result 1997(millions in US\$) | 40% |
| Passengers Carried (in millions) | 3.34 |
| Passenger Load Factor | 51.4% |
| Average Aircraft Utilization | 11:30hrs |
| Flights Per Day:400 | 400 |
| Employees | 3.500 |





TAM ROUTE MAP





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Aircrew Incident Reporting System (AIRS)

- AIRS was developed by Airbus Industrie to help airlines establish their own Confidential Reporting System .
- The focus is to collect and understand latent or systemic factors as well as the behavioral aspects of operational events.
- The analytical part of AIRS aims to provide answers as to the “how” and “why” a certain incident occurred.



AIRS experience to date



- 3 months to get the hardware
- The AIRS forms took about 1 months to get them printed.
- By the end of Sep. 98, we had the AIRS system up and working

| QUESTIONÁRIO CONFIDENCIAL DE FATORES HUMANOS | | |
|---|-----------------------------|----------|
| Data do Incidente | Número do Vôo | Número |
| Tipo da Aeronave | Função : Capt - E/O - FA | PF / PNF |
| Se você quiser ser contatado, favor escrever seu nome e o número do seu telefone : Nome : _____ Tel : _____ | | |
| ... | | |
| 1. Descreva o evento, em relação aos fatores externos tais como : meteorologia, ATC e facilidades do aeroporto. | | |
| 2. Como você se sentia e qual era a relação entre os membros da tripulação ? | | |
| 3. Como você e sua tripulação responderam ao incidente ? | | |
| 4. Todos os procedimentos foram executados de maneira satisfatória? As informações técnicas requeridas eram familiares e facilmente disponíveis ? Se não, favor especificar o que poderia ser aprimorado. | | |
| 5. Como seu treinamento técnico e não técnico (ex: CRM, EMERG) prepararam você para esta situação ? | | |
| 6. Qual é a lição mais importante aprendida deste incidente ? | | |
| 7. Algun outro comentário ? | | |
| Número : _____ | | |



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AIRS experience to date



- We had problems with pilots to accept the AIRS system.

**AIRS and ARS
FORM**

CONFIDENCIAL

Favor preencher esta ficha, conforme a **NSMA 3-1** do Ministério da Aeronáutica, caso ocorra uma das situações abaixo:

Acidente Aeronáutico: é toda ocorrência relacionada com a operação de uma aeronave, havida entre o período em que uma pessoa nela embarca com a intenção de realizar um vôo, até o momento em que todas as pessoas tenham dela desembarcado e, durante o qual, pelo menos umas das situações abaixo ocorra:

1. qualquer pessoa sofra lesão grave ou morra
2. a aeronave sofra dano ou falha estrutural
3. a aeronave seja considerada desaparecida ou o local onde se encontre seja absolutamente inacessível.

| | | |
|-----------------------------------|---|---------------------------------------|
| Pessoa sofra lesão grave ou morra | Aeronave sofra dano ou falha estrutural | Acidente com hélice, rotor ou turbina |
| Acidente pessoal em vôo | Aeronave atingida por objeto | Colisão de aeronaves em vôo |
| Colisão de aeronaves em solo | Colisão em vôo com obstáculo | Colisão em vôo com obstáculo |
| Falha ou alteração estrutural | Fogo ou explosão | Perda de controle em vôo |
| Perda de controle no solo | Pouso antes da pista | Pouso Brusco |
| Pouso longo (varar a pista) | Pouso forçado | Pousos de precaução |
| Pouso sem trem | Falha ou recolhimento do trem de pouso | Outros |

Incidente Aeronáutico: é a ocorrência anormal, que não é um acidente, associada à operação de uma aeronave, havendo intenção de vôo, e que afete ou possa afetar a segurança.

| | | |
|--|--|--|
| Alteração estrutural ou aerodinâmica | Colisão | Colisão com pássaros |
| Com alvo rebocado | Com canopi ou pára-brisa | Com comando de vôo |
| Com hélice, rotor ou turbina | Lançamento ou transporte de carga ou pessoal | Com trem de pouso |
| Descompressão não intencional ou explosiva | Desorientação espacial ou altitude anormal | Desbarismo |
| Disparo involuntário de armamento | Estouro de pneu | Explosão à substância tóxica |
| Falha do motor | FOD | Falha de sistema ou componente de vôo |
| Hipóxia | Indicação falsa de instrumento | Ocasionado por fenômeno meteorológico |
| Perda de componente | Perda da consciência | Perda de Controle de vôo |
| Perda de controle no solo | Pouso em local não previsto | Quase colisão |
| Ricochete ou aeronave atingida por objeto | Sopro de hélice, jato ou rotor | Vazamento de combustível ou outros fluidos |
| Outras situações | | |

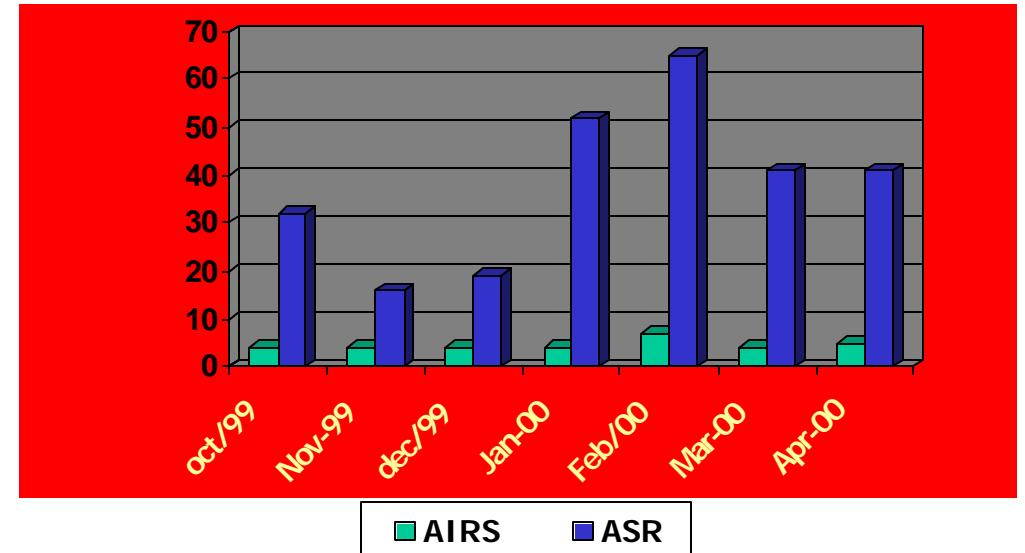


AIRS experience to date



- Brazilian pilots do not like to write a lot.
- They believe: they could get in trouble if they write something, against the company.

AIRS x ASR REPORTS





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Operational Readiness Review

Attributes

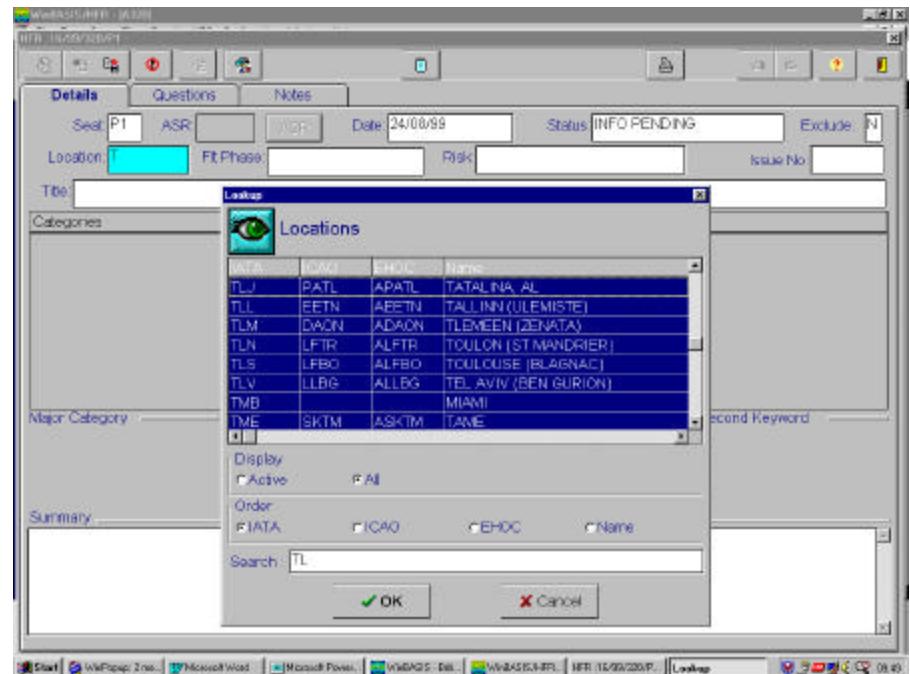
- **Usefulness:** “How helpful is tool to airline flight safety office? Is there a good match among:
 - Available input data
 - Capabilities/characteristics of tool
 - Airline’s higher-level information needs?”
- **Usability:** “How easy is tool to use in terms of set-up, applying input data, generating results, and disseminating results?”



Initial Impressions

“Usefulness”

- **Data Applicability**
 - The supporting software of AIRS allows storing, questionnaires from Flight & Cabin in a standardized way.
 - AIRS is being used by many airlines in the world. Enhance the perspective into HF (Human Factors) aspects of incidents reports. Its compatible with BASIS and easy to use.

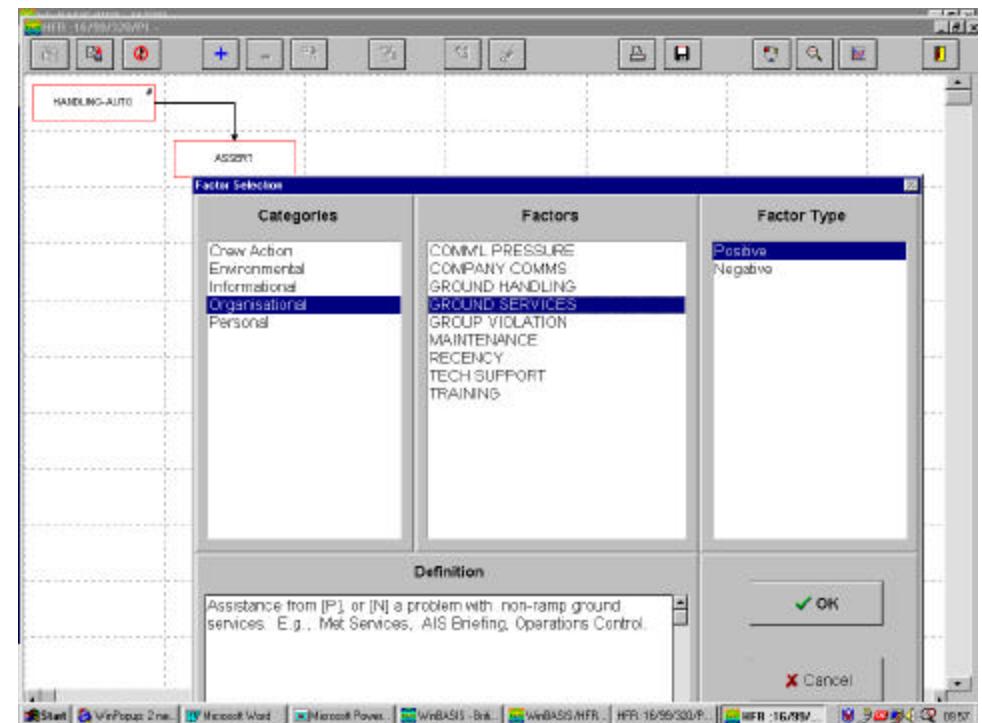




Initial Impressions

“Usefulness”

- **Complexity of Analysis Process - Low**
 - Translating the raw data into useful information by assigning cause and effects of contributory factors is an easy task. However a certain level of training and hands-on experience is required.

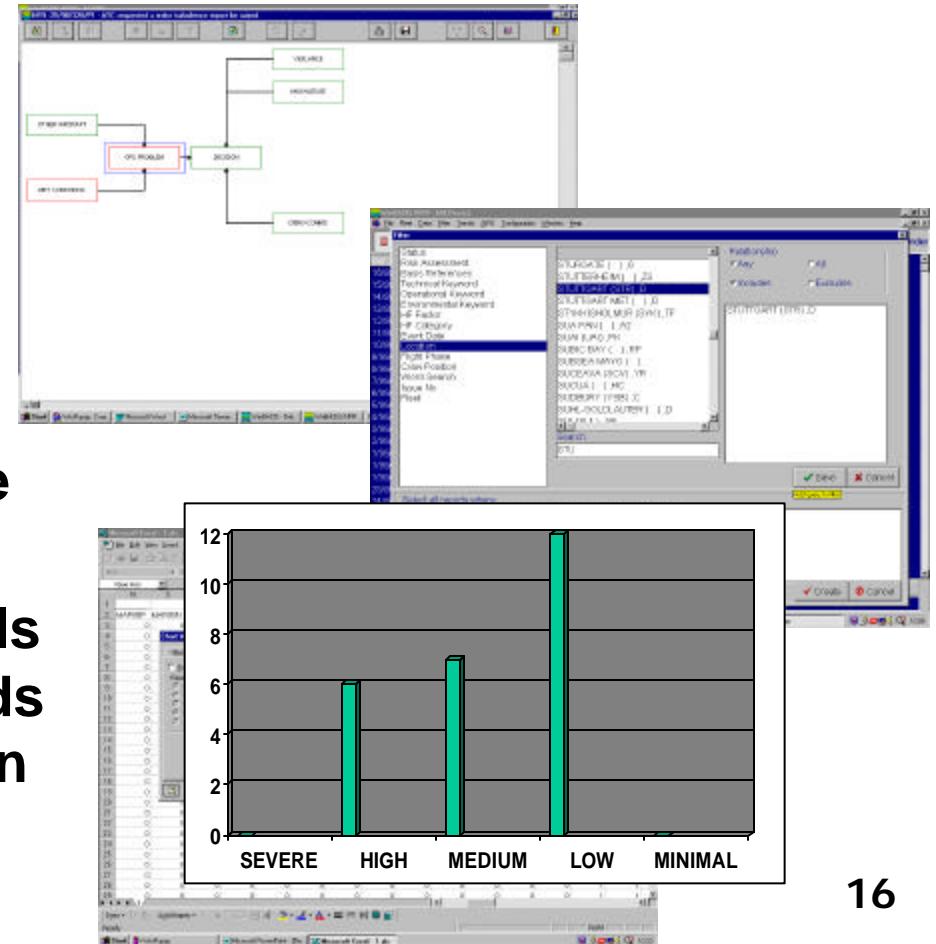




Initial Impressions

“Usefulness”

- **Quality of Analysis Results - excellent**
 - Highly useful results are generated. The filter option allows rapid comparison of similar events which can be easily displayed by using the internal graphical tool.
 - Using external statistical tools allows to display safety trends and develop recommendation to prevent future safety events.





Initial Impressions

“Usability”

- **Tool Set-Up - easy**
 - Tool set-up and installation is straightforward and requires little effort (“plug and play”). No additional software, programming, or adaptation is required.
- **Data Entry/Importation- easy**
 - Data entry/importation requires little amount of reformatting to get the data into a format that can be accessed by the tool.
- **Generation of Analysis Results- moderate**
 - The user may be required to perform a limited number of intermediate steps prior to obtaining final results.
- **Dissemination of Analysis Results - moderate**
 - Some reformatting is required prior to dissemination of analysis results.



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Closing Comments

- The AIRS concepts was tailored to better understand and deal with the HF side of incident reports.
- The results are very useful but also the non-linear aspect of human behavior should be take into account.
- Wish for yearly AIRS user conferences.
- AIRS should build synergy with qualitative FOQA data.
- We encourage additional airlines to participate in exploring analytical tools and methods with Working Group B.
- We look forward to continued partnering with Working Group B.



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Mercy

Obrigado

Thanks

Danke

